



Free Beginner's Guide to **Woodworking** **Tools**



Hand Tools

FOR

\$100

If you're a beginner and money is tight, you can buy all the hand tools you'll need to start woodworking with just a C-note.

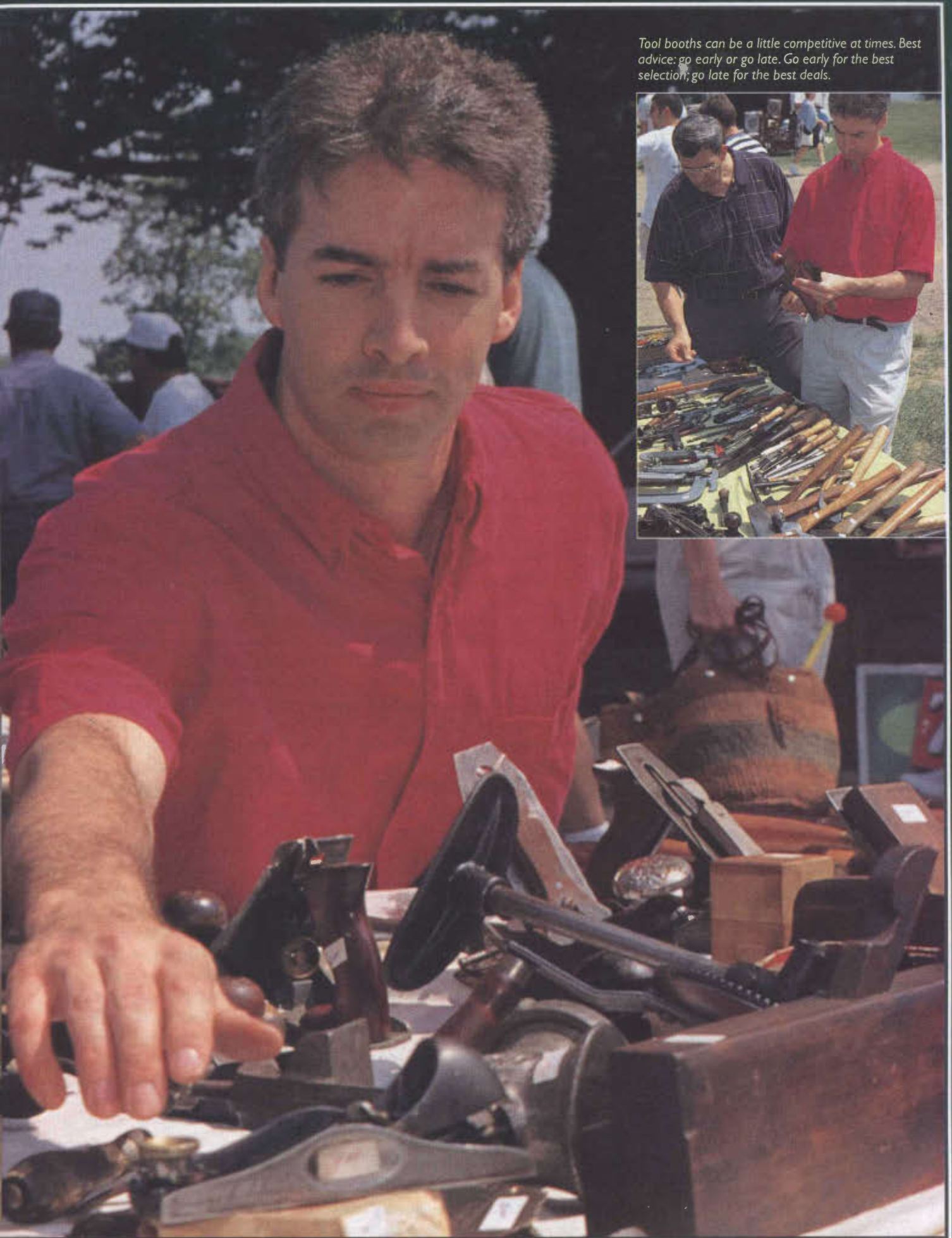
Beginning woodworkers have it bad when it comes to buying their first hand tools. First you have to figure out what tools you need to get started. Then you have a hard choice. You can buy the cheapest stuff at discount stores and risk being disappointed with the quality later. Or you can buy the nice stuff from catalogs and specialty woodworking stores that is considerably more expensive. However there's a third option that few beginning woodworkers consider: buy used hand tools.

Flea markets, garage sales and antique malls are usually awash with quality used hand tools at reasonable prices. A #4 Stanley smoothing plane that costs \$57.50 new in the box can be had for \$15 to \$20 used. Wooden handled chisels that average about \$10 each new can be bought for \$5. There are some downsides to buying used, though. If you're not happy with your purchase, it's unlikely you can get a refund. And some used tools need restoration before use. But if you follow the guidelines in this article, you can minimize the amount of time you'll spend fixing up your old tools and quick-

by Christopher Schwarz



Tool booths can be a little competitive at times. Best advice: go early or go late. Go early for the best selection; go late for the best deals.





Beginning woodworker Ed O'Connell checks out some of the tool bargains at an antiques market in Kentucky. While you can find used tools at garage sales and antique stores, open-air markets like this always seem to be the most fruitful.

ly put your new toys to work.

Let me first say that buying used isn't for everyone. It's unlikely you'll be able to go to one flea market on a Saturday morning and equip your entire shop. So you're going to have to shop around. And for many people there's something inexplicably appealing about owning a brand new tool. But if money is tight and you've got a few weekends free, it's entirely possible to equip your shop with all the basic hand tools for less than \$100.

Your Shopping List

First figure out what you need to get started. Even if you're a power tool junkie you're going to have to buy about 20 hand tools (until they invent an electric scratch awl). If you're inclined to do all your work with hand tools, this list is still a great place to start — you'll be able to do a lot of things with these tools. The chart below is a decent shopping list with some average flea market prices that we've seen in the Midwest, South and East. When you go shopping, be sure to take a list of the tools you need, a good-quality steel ruler marked in inches and a pencil.

There are four places to find good used tools: auctions, garage sales, antique malls and flea markets. Auctions are great because you can sometimes pick up an entire box of tools for \$20. The prices are reasonable because this is where many flea market vendors purchase tools to sell. But auctions are time consuming. You can sit

all day waiting for the tools you're interested in to come up for sale. And even then you might lose to a higher bidder and end up only with a few extra pounds from all those pimento cheese sandwiches you ate.

Garage sales are nice because the person running them might have no idea how to price the tools. I've found good hand planes at yard sales for \$5. Problem is you usually have to drive all over town to find a garage sale that may or may not have tools for sale. And most garage sales have just a few tools for sale. Antique malls, on the other hand, are nice because there are usually lots of tools to choose from. But you have to pay for that convenience. Prices can be higher than those listed here and there's little chance to bargain.

I prefer the flea markets. There are lots of tools to choose from, there's no waiting around and the prices are low, especially if you are willing to haggle.

Chisels

You've gotta have chisels. From squaring up rabbits cut with your router to paring dovetails, chisels are a necessity. Luckily, used chisels are easy to find and inexpensive. The nice thing about used chisels is that the majority of them have wooden handles, which I'm partial to. The downside to used chisels is you're going to have to grind the cutting edge back to square. I've never seen a used chisel that didn't need work.

But don't get too worked up about that. Many new chisels need to be reground

right out of the box, too. So when you're looking to buy a used chisel, here's what to keep in mind. First measure the chisel with your steel ruler to make sure it's a size you need. Look for chisels that aren't too rusty, especially on the back. Surface rust is OK, but if there are deep pits on the back of the chisel, you'll have a lot of flattening to do before you can get a decent cutting edge. Rust on the front isn't a big deal, as long as it's not too severe.

How much of the blade is left is also important. Unless the chisel is a butt

SHOPPING LIST

Tool	Low price	High price	New price ‡
Wooden-handled chisels			
1/4" chisel	\$4	\$7	\$7-\$11
3/8" chisel	\$4	\$7	\$7.25-\$11
1/2" chisel	\$4	\$7	\$7.50-\$11
5/8" chisel	\$4	\$7	\$7.50-\$11
3/4" chisel	\$4	\$7	\$8.50-\$11
1" chisel	\$4	\$7	\$9.50-\$11
Wooden-handled mortising chisels			
1/4" chisel	\$5	\$7	\$16
3/8" chisel	\$5	\$7	\$17
Backsaw*	\$5	\$15	\$19-\$50
Coping saw	\$5	\$7	\$6-\$10
Low-angle block plane	\$7	\$18	\$45
#4 Smoothing plane	\$15	\$20	\$54
Scraper †	\$5	\$5	\$5
Mill bastard file	\$1	\$2	\$6
Burnisher	\$3	\$5	\$10-\$20
Screwdrivers	\$2	\$3	\$3 each
Combination square	\$5	\$25	\$20-\$65
Scratch awl	\$2	\$7	\$5-10
Marking gauge	\$4	\$8	\$10-\$40
Sliding bevel gauge	\$5	\$8	\$16-\$20

* I recommend buying a new backsaw. Read why in the story.

† You're unlikely to find a used scraper. Buy a new one.

‡ Prices for "new tools" are for tools comparable in quality to what you'd find used.

Chisels are plentiful, so you can be picky about the quality and price. Here a couple chisels sit among some carving tools—another common item at shows (right).

Always take a ruler when buying tools. You need only one $\frac{3}{8}$ " chisel for your toolbox (below).



chisel (which is supposed to have a short blade) you should have at least 3" to 4" of blade remaining. If you've got less, you might not have any tempered steel left in the blade and the chisel won't hold an edge. Pass.

Now check out the handle. Can you pull the handle out of the socket? If you can, you'll need to fix that or turn a new handle. Follow the same rules with mortising chisels, which have considerably thicker blades and no bevel on the sides. In addition, make sure these look like they can take a lot more abuse, such as getting whacked by a hammer every day.

Backsaw and Coping Saw

You need a backsaw for cutting dovetails and tenons, and other small work. Backsaws are so named because they have a rigid spine clamped to the back of the blade that stiffens the blade during the cut. Larger backsaws are called tenon saws. Smaller ones are called dovetail saws. And little ones with a round handle are often called gent's saws. You'll find a lot of saws for sale, but they usually need a lot of work, such as fixing missing teeth and sharpening. Let a professional do this for you.

If you're not an old tool purist, I recommend you buy a new Japanese-style backsaw. Lee Valley Tools, for example, sells a great Korean-made Dozuki backsaw for \$18.95 (item# 60T55.01 • 800-871-8158). I like Japanese-style saws because they cut

on the pull stroke, instead of the push stroke, so they're easier to control. Plus the kerf is considerably thinner than Western saws.

Coping saws are simple tools that are great for cutting curves and cleaning out waste between dovetails. Make sure a used one is fully adjustable. That is, you can lock the blade at any angle. Buy some new blades for about 30 cents each at the hardware store that have 15 teeth per inch.

Planes

You'll need a low-angle block plane for lots of stuff. For example, when you've glued up two pieces of wood and one edge is slightly proud of the other, a low-angle block plane is great for leveling the joint.

You'll usually find two kinds of block planes for sale: one is your plain old block plane, the other is a low-angle block plane. Block planes have the blade set at about a 20-degree angle to the sole. The blade in the low-angles is set at 12 degrees. Low-angle planes will cut everything that a block plane will, and they work better on planing end grain and highly figured woods. So try to buy a low-angle version if you can.

You also want this tool to have an adjustable throat. The throat is the opening between the blade and plane body. It's important that this is adjustable because the thinner the opening you can create, the less tearout you'll get — especially in figured woods. To see if a block plane has an adjustable throat, unscrew the front knob on the plane and try to wiggle the piece of

metal on the sole in front of the blade. If it moves, your throat is adjustable.

Another issue with used block planes is the blade itself. Look for one that's not too rusty and has some life left in it. New block plane blades are about $4\frac{1}{2}$ " long. If yours is considerably smaller, you might be in for trouble. Replacement blades for some block planes can be tricky to find, especially for oddball brands. It's safe to pass on block planes with stubby blades.

Now check the plane bottom for flatness. Hold your straightedge — edge on — against the sole of the plane and up to a light. If you can see some significant gaps between the ruler and sole, you could be in for a lot of work. Flatter is better.

Another nice feature in block planes is called "lateral adjustment." This allows you to pivot the blade slightly to the left or right to get a perfectly square cut. Lateral adjustments aren't the same on all planes so look for a lever on the back of the plane that moves the blade left or right.

Smoothing planes are useful for heavy-duty planing. If you have a rough-sawn edge on a board, a smoothing plane can dress it. You also can use it for the final smoothing of rough-sawn lumber. Most smoothing planes, especially those made by Stanley, will have a #4 on them. If you can't find a #4 plane, a #3 or a #5 will also serve you well as a first all-purpose plane.

Many of the same rules for block planes apply to smoothing planes, except smoothing planes do not have adjustable throats.



A couple of decent block planes. The one on the left was tempting because it was a bargain; however it didn't have an adjustable throat and it was a standard block plane, not the low-angle version. The plane on the right was priced at \$18, which is OK for a low-angle block plane with an adjustable throat. The small shiny ring below the front knob of this plane moves the throat forward and back.



Ed checks the sole of a smoothing plane to see how flat it is. You can flatten plane bottoms using a slab of glass, some kerosene and 90-grit silicon carbide (available in many woodworking catalogs). However, the more light you can see under that ruler, the more work you'll have to do to flatten the sole.

Instead they have adjustable frogs. The frog is the piece of metal that the blade sits on. By moving it forward you can close the throat. Look for a frog screw at the back of the plane. Planes without this screw are still somewhat adjustable, but it's more of a pain to accomplish.

A WORD ABOUT WHITE ELEPHANTS

There is something magical about finding a mint-condition tool at a flea market that sends all reason into a tailspin. A few months ago I was looking at two #4 smoothing planes in a shop in Florida. Both were Stanleys. One was obviously very old but looked so sparkling new that it could have had robot dust on it. Price \$63. The other one was cruddy and used and only \$23. Like a crow that's drawn to bright and shiny objects, I was mesmerized by the pretty one, even though it was way too expensive.

Then I came to my senses. I checked the sole of each plane with a straightedge. The old plane was almost perfectly flat. The shiny one was horribly warped, twisted, you name it. It was unusable, except as a paperweight. So if you see a shiny tool at a flea market be careful. There's a reason that tool might never have been used. It could be that it was born a piece of junk.



Look for a frog adjustment screw when picking out a smoothing plane. This screw moves the frog forward and back, which opens and closes the throat of the plane.

Scrapers

Scrapers are simply a piece of hardened metal that have a special burr on them. These useful tools work like supercharged sandpaper and can flatten tabletops and remove glue squeeze-out. I have yet to see a used one for sale. Buy a new one. You'll also need to buy a mill bastard file and burnisher to sharpen your scraper. Mill bastard files will be marked as such. Burnishers look like a metal magic wand with a wooden handle.

Combination Squares

The combination square is a constant companion to the woodworker. It can lay out joints, draw lines parallel to the edge of a board, draw 45-degree miters and set up all your machinery. So be careful when you buy one. I usually look for a Starrett-brand square. They cost more (\$25 used; \$57 new), but they're worth every penny. Other squares are serviceable if money is tight. Here's what to look for.

First make sure your square is still square. Put the square against the edge of a piece of wood and mark a line. Now turn the square over and mark a second line very close to the first. If the lines are parallel, your square is square. Otherwise pass.

Make sure you can lock the blade down tightly. If you find one that passes all these tests, don't think about it, buy it. Good squares are hard to find.

Marking Gauge

The marking gauge lays out mortises, tenons and dovetails. A pin on one end of the gauge marks the wood while the head determines where that mark is made.

Look for a marking gauge with a pin that hasn't been ground out of existence. Some gauges have two pins. These are nice

for laying out mortises and tenons. If you find one of these, consider it a bonus. Also, make sure you can lock the fence tightly on the beam.

Sliding Bevel Gauge

These handy contraptions are useful for transferring angles from one place to another. Say you need to set your table saw's blade to a particular angle that matches a piece on your project. Adjust the bevel gauge to the angle on the project and lock the blade down. Now put the gauge against your table saw's blade and tilt it until it fits perfectly against the bevel gauge.

There are two things to look for. First make sure the blade isn't too rusted or warped. You want it to be as straight as possible. Second, make sure you can lock the blade down tightly so it won't move if you bump it slightly.

Bargaining

Some people love to haggle; others won't do it except when buying cars. I'm indifferent, but I can almost always get a better price one of two ways — without being



The rust on this sliding bevel gauge isn't much to worry about. Be more concerned with the gauge's ability to lock down.

rude. First, assume they'll come down about 15 to 20 percent on most items, then offer that much. If a plane is \$25, offer \$20. They'll almost always take it. Second, buy two or more items from the same dealer. Usually the price becomes more flexible. I once bought a \$25 plane, a \$25 combination square and an \$8 bevel gauge for \$40 — 31 percent off.

One more thing: prices at flea markets usually go down as it gets closer to quitting time. Sure the selection ain't as good, but if you're ready with cash, the dealer won't have to pack up the item for his next show. You just might get lucky. **PW**

Choose Your Tooling and Storage

Make a list of all the machines, the tools and the storage areas that you ultimately will want.

FURNITURE OR CABINETRY SHOP If you want to build furniture, consider:

- workbench
- drill press
- table saw
- disc/belt sander
- band saw
- joinery machine
- router table or shaper
- dust collector
- jointer
- scroll saw
- planer
- air compressor

Also consider storage cabinets and shelves for:

- routers
- biscuit joiner
- drills
- clamps
- sanders
- hand tools
- spray equipment
- finishing supplies
- air tools
- lumber and plywood

WOODCARVING SHOP

- workbench
- dust collector
- band saw
- scroll saw
- grinder (powered sharpening device)
- drill press
- disc/belt sander

And storage cabinets and shelves for:

- rotary carving tools
- clamps
- sanders
- drills
- burrs and bits for rotary tool
- finishing supplies
- assorted hand tools (carving chisels and mallets)
- lumber and small pieces of wood

WOODTURNING SHOP

- lathe
- drill press
- workbench
- dust collector
- band saw
- grinder (or a powered sharpening device)

And storage cabinets and shelves for:

- lathe tools
- lathe accessories
- drills
- hand tools
- sanders
- finishing supplies
- sanding supplies and sandpaper
- lumber, blocks, logs and small pieces of wood

MISCELLANEOUS NEEDS List all other important features that are useful for any woodshop:

- electrical service panel
- electrical outlets (110V and 220V)
- plumbing (sinks, toilets and so on)
- secondary lighting (spotlights)
- windows
- doors
- containers for scrap wood

Design the Woodshop on Paper

Use $\frac{1}{4}$ " grid paper and use a scale of $\frac{1}{4}$ " = 1'. First, draw the shape of the woodshop. Include all permanent elements of the room, such as support beams, steps, water heaters. On another sheet of paper, draw representational shapes of all machines, shelves and storage units and cut them out with scissors (or copy the images on page 31 and use those). Now, try the cutouts in different locations on the floor-plan drawing. Note the way that open space or machine positions differ from your preconceptions of an idealized layout. It may seem that particular machines, which should be easy to place, become difficult to locate because of windows or doors. Storage units may have to be modified from original designs because of machine placement or electrical outlets.

Designing With a Paper Grid and Paper Tools

Obviously, it's easier to move pieces of paper than machines and cabinets, and the benefits of this technique are far-reaching. Generally, the problem with home woodshops is too little space, not too much space. Placing items becomes a struggle toward efficiency. When arranging the paper cutouts, it might become apparent that the floor plan and machinery don't match. There may not be enough space for your needs. It may be impossible to have a comfortable blend of machines, cabinets, safe areas around machines and open work areas. The paper cutouts will aid in this discovery, which is part of the reason that you should include every possible item on the master plan list. Don't leave out machines and shop furniture that will be acquired in the future. Even if the purchase of something is several years off, include it in the master plan. All too often the owner of a cramped woodshop will spend too much time attempting to overcome the problem of space limitations. Storage becomes convoluted, machines are too close together and, instead of working on projects, time is spent either moving things around or finding, or hiding, objects. Be prepared for future acquisitions.

Planning for the Future

Here's an issue that's complicated and somewhat vexing: How do you know how to start out compared to where you will end up? Perhaps you've seen beautiful handmade furniture, bowls and carvings at a craft fair, and this has inspired you to take up woodworking. But you've had no woodworking lessons or experiences with other woodworkers. What do you do to get started? Let's assume that you read woodworking books and magazines, watch do-it-yourself videos and visit tool stores. All of these are very inspirationally produced by experts. But do these sources really help you to find a starting place? The ques-



(left) This is the exterior of Steve Balter's shop.

(above) Steve Balter has a display room in the front of his workshop.

tion is, will you make furniture, turn bowls or carve? What if you set up a woodshop for carving and later find that lathe-turned bowls are your real interest?

Relax. When you create the master plan, realize that most machines are for general-purpose applications. Table saws and band saws aren't designed for single-purpose use. However, carving chisels and lathe tools are single-purpose tools. Fortunately, you can start out with a half dozen of these tools and not spend a large sum of money. And if you decide that carving isn't for you, it's easy to sell them. If you aren't certain of the type of woodworking you want to pursue, initially stay as general as possible, realizing that some tools are worth purchasing, if for no other reason than for experimentation.

BUDGETING FOR SHOP SETUP

If you are setting up a woodshop for the first time and have never pur-

chased machinery, tools and supplies, don't get discouraged. I have talked with hundreds of beginning woodworkers and heard many very similar questions. Usually beginning woodworkers have specific budget amounts and space limitations as their first priorities. These conditions are quickly followed by questions about what type of machinery and hand tools should be purchased. After these issues, questions follow about specific brands, where to purchase machinery and tools, what books and magazines are recommended and where one can find how-to and hands-on instruction. The response to these questions is like the solution to a complicated mathematics problem: Start at the beginning, do your step-by-step work on paper, and progress through every step until the solution is found.

Translating that type of formula into designing a woodshop is straightforward. Suppose that your budget is \$3,000 for machinery and tools,

the potential woodshop area has 200 square feet, and you are planning on generalized woodworking for yourself and your family. First, what will \$3,000 purchase? Make a list of possible selections. Also factor into this list whether you are planning to purchase locally or through mail-order catalogs and whether you prefer machines made in the U.S.A. or those made in foreign countries.

Prioritize Your Purchases

Obviously both lists are over budget, and neither list includes hand tools, sharpening supplies, sandpaper and so on. The next step is to prioritize the tool list and purchase the most important items first. For general-purpose woodworking, the scroll saw and lathe may not be necessary. However, design the woodshop location as if all the listed machines and tool items were available. It's much easier to create the layout requirements in the planning stage than to

Potential Machines and Costs

LIST A		LIST B	
Cabinetmaker's table saw	\$1,600	Contractor's table saw	\$800
15" stationary planer	1,000	12" portable planer	400
6" stationary jointer	1,300	6" portable jointer	300
12" band saw	900	10" band saw	350
Heavy-duty lathe	2,000	Benchtop lathe	450
16½" floor drill press	400	Benchtop drill press	100
Scroll saw	500	Scroll saw	200
Cyclone dust collector with duct	1,000	2-bag dust collector on rollers	400
3-hp plunge router	280	1½-hp standard router	200
Router table w/additional router	400	Router table only	100
Plate jointer	200	Plate jointer	200
14V cordless drill	210	12V cordless drill	185
Finish sander	80	Finish sander	80
4" x 24" belt sander	225	3" x 21" belt sander	170
Total	\$10,095	Total	\$3,935

retrodesign a woodshop when space is unavailable or wasn't factored into construction plans.

If you plan on cutting large amounts of plywood and can't decide between a cabinetmaker's table saw (e.g., Delta's Unisaw), because you think it would be more advantageous for this procedure, and a contractor's table saw, because it better fits your space, consider the following alternative. Size plywood into smaller sections with a circular saw or jigsaw by cutting approximately 1/8" wider than the measured layout lines and cleaning the rough-cut plywood edges using a router, a straight bit and a clamped straightedge. Or construct auxiliary tables on both sides and outfeed areas of the table saw so that the plywood is manageable during cutting.

When I started woodworking, I had only a vague concept of what tools to purchase. At that time, there were no magazines devoted to woodworking and the hardware stores were primarily devoted to the trade (i.e., contractors and builders). And 20-some years ago, the main articles in the mechanic-type magazines were either "Table Saws Versus Radial-Arm

Saws" or "How To Build a Plywood Dingy." It was difficult to find information or sources for antique tools, specialty tools, foreign-made tools or high-quality tools. Over the years, I have purchased a variety of table saws, routers, drills and assorted gadgets. Most of my earlier purchases have been replaced with upgraded versions, and the original tools were sold through the newspaper classified section. The point is, your skills, pocketbook and interests change with time. If you know what you want now, that's great. But don't worry if you aren't sure — you will know in time. So if you can't afford a particular machine at the moment, purchase something that is affordable and upgrade later on. If you want to try something different, go ahead and try it. If it isn't right for you, it's easy to resell most tools; there's always eBay.

PLANNING STORAGE

The storage in most woodshops that have evolved over years of use is generally haphazard. It's common to see cabinets built in odd locations because the space was unused or was too awkward for other uses. When a

woodshop is properly planned and designed, cabinets and shelves fit the room and present an orderliness that makes work easier. If possible, construct storage cabinets in modular units. A set of smaller cabinets is easier to build and easier to move within the room. For example, a 9'-long wall is available for cabinets. It's conceivable that one 9' cabinet could be installed. However, it's difficult to build something that large and then install it. It would be much better to build a set of three cabinets, each 3' long. In fact, build one as a start, and then build the others as the need for more storage arises.

Make paper cutouts of generic rectangular shapes to represent potential storage units. If the storage is wall-mounted above another unit or apparatus, color the elements different colors so that they are visually separated.

Storage Options:

- floor to ceiling
- wall-mounted above machines or benches
- under stairs
- under machines
- flush fit between wall studs
- overhead in rafters

PLANNING MACHINE LOCATION

Two general rules apply to the locations of the major machines — table saw, radial-arm saw, jointer, planer and band saw, in the shop. First, certain machines, like the jointer and radial arm saw, are only used from one side. Second, there has to be enough room around other machines, such as the table saw and planer, for wood to enter and exit the machine. When using the paper cutouts, a logical starting point is to place the one-side-only machines against walls. Optionally, certain machines can be grouped together, such as placing the jointer and planer side by side. But make sure to allow enough space for long boards to safely clear a machine without bumping into other wood-



Tom Dailey's woodshop is located in a ground-level basement. Plywood is brought in through the back door, then cut with a panel saw.

shop items. For example, if a heavy board 2" x 8" x 80" is processed on a jointer, the operator not only has to maintain the board on the machine, but he also has to be able to take the board from the outfeed table and not ram it against other woodshop items. In other words, the entry and exit areas around certain machines must be clear. This space is as important as the space the machine occupies.

Table Saw

If full sheets of plywood are routinely cut, place the saw centrally in the woodshop and build secondary support tables. Keep the pathway to and from the table saw unobstructed so that the plywood can be safely

handled and moved. For small woodshops, panel saws are an alternative to the table saw. These are wall-mounted units that support the plywood, with a track-mounted circular saw for making the cuts.

Radial-Arm Saw

If long boards are routinely cut with a radial saw, the saw should be placed against a wall, with long secondary support tables on either side. Many woodworkers with basement woodshops set up a radial-arm saw in the garage and perform rough cuts there, and then move the shorter pieces to the woodshop. Note: If the radial-arm saw is in the garage and away from the main woodshop, it should be

equipped with a lock for the on/off switch. This prevents children or other curious types from turning on the saw when the owner isn't present.

Band Saw

If the band saw is used primarily for ripping and resawing long boards, it too can be located against a wall. The work is moved parallel to the wall, providing a clear pathway for board entry and exit from the blade. However, if the band saw is used to make curved cuts, the board is moved in a radial manner, much like a clock hand, with the blade at the center point. For this type of use, the band saw should be more centered in the woodshop, away from walls.

Dust Collector

The dust collector, although very useful, has to be one of the most difficult machines to place in the woodshop. It has an awkward shape, and certain models radiate fine dust and noise. Ductwork, gates and connectors are also potential complications. If you don't want multiple ducts or hoses, there are portable collectors with short lengths of hose, that can be placed near a machine. This method only works if you're doing limited work with the floor free of obstructions. The best method is placing the dust collector somewhere away from the work area and using ducts to the machines.

To control the dust that settles around a collector, and to reduce the noise level, the dust collector can be located in a closet-type of room. If you choose to do this, be certain that there is air flow into the room. Cut a square hole in the door and cover it with a furnace filter. The filter keeps dust from exiting the room, and the hole will reduce air pressure within the room. I've seen a dust collector room that, when the collector was running, created so much air pressure that the door couldn't be opened. That isn't wise.

Miscellaneous Tools and Machines

A number of machines are used to primarily process shorter lengths of wood. This allows for some freedom in floor plan use. The drill press, router table, shaper, scroll saw and joinery machines can be located in less open areas. Occasionally, the router table or shaper is used for longer pieces; the machines can then be moved for these specific operations.

PLAN FOR ELECTRICAL AND PLUMBING NEEDS

When a new building is under construction, there is a sequence to the order of events. That is, electricians and plumbers complete their work before drywallers and painters. While this sequence should apply when converting a basement or garage into

HIRING A CONTRACTOR

Some tasks may be too complicated or require specific expertise. There are many advantages to hiring a contractor or other specialist when remodeling or building a new woodshop. The problem is how do you know who to hire?

Never underestimate the complexities of building or remodeling a woodshop. Just as with a house, the fundamentals of framing, electrical, plumbing, concrete, trenching and all the other construction techniques are required.

While there are many who are skilled enough or have enough time to do their own work, often it is better and faster to have someone else do the work.

If you've done your design work and choose to hire a contractor, you must be comfortable with your choice. After all, this person is going to turn your drawings into your ideal woodshop.

Selecting a contractor isn't that simple. The building process is complex and expensive so you must be certain that it will go according to your stated objectives and budgetary limits.

- If you don't know of a reliable contractor, ask friends and colleagues for their recommendations.
- Watch for any remodeling work being done in your own area. Pay attention to any signage on trucks or yard signs. Ask the homeowner if they are satisfied with the work being done.
- Inquire at local lumber yards, building supply centers and hardware stores for recommendations.
- Check with local builders or trade associations.
- Ask all potential contractors for references and photographs of their work. Note: It's easy to have photos of any attractive project. Check photos for images of the contractor, the company's sign, some sort of indication the work was actually done by the person showing the photos.
- Once you have selected a contractor, talk with him concerning recommendations for subcontractors.
- Indirect recommendations often occur after several unrelated sources recommend the same person.
- A personal note: I don't like contractors' advertisements with only a telephone number listed. I want to see a street address or at least a city name.

a woodshop, the electrical wiring and plumbing are often undervalued. It is not uncommon to see that the one or two existing outlets in the garage or basement are overused with extension cords and extension bars. If there is a laundry sink or toilet already in the garage or basement, it is usually left as is. Wouldn't it seem to be much smarter to upgrade both the electrical systems and plumbing while designing the woodshop?

Wiring the Shop

The importance of having a proper electrical service cannot be overstated. First, I advise against using very long

extension cords. Not only do they create more floor clutter, but long extension cords can lead to unnecessary electrical motor wear. A representative from an air compressor company once told me that the majority of compressors returned for motor repairs were those that were used with extension cords. Apparently, owners forgot that longer air hoses were a better way to work at a distance from the compressor. I have one retractable ceiling-mounted extension cord in my woodshop. It's 30'-long 14/3 SJT wire and rated at 13A, 125V, 1,625 watts. I only use it with hand drills, finish sanders and similar tools. I would

never use it for band saws and other stationary machines.

The placement of machines relative to the proper outlet is fundamental. If you want to use the table saw at a particular location, then having an isolated 110V or 220V outlet at that location is mandatory. Since this section is about guidelines for designing the woodshop, the key factors are: wiring from an existing service panel (interior or exterior to the wall), installing a subpanel, outlet locations and location of lights.

Interior wiring is difficult when the wall studs and ceiling rafters are already covered. The standard technique is to cut holes in the wall or ceiling and “fish” the new wires in place using a fish tape tool. New wiring that is not within walls should be run through metal conduits that are firmly attached to the walls. If the room framework is still exposed, it’s straightforward to run wiring through the studs, around windows and door frames to the service. Subpanels are a very good choice when upgrading the woodshop. They are easily mounted near the main service panel, and conduit can then be routed anywhere in the woodshop.

The design of the outlets should accommodate both the placement of machines and the use of electrical tools at various locations. There should be outlets near both ends and at the center of the workbench, as well as outlets near the open areas in the woodshop that can be used for assembly and detail work. For example, you have constructed a 3’-wide by 7’-high bookcase and want to use a router for detail work on its sides. If the bookcase is set on the workbench, it may be too high for safe and easy work. If the bookcase is on the floor in an assembly area, the work height is correct. An overhead outlet or outlet about three feet from the floor will facilitate the router’s use.

Shop Plumbing Concerns

The same generalities apply to plumbing. Is plumbing necessary

in a woodshop? From a design viewpoint, if form and function are considered, the question is, “What value does plumbing serve?” What I value in a woodshop sink, besides washing my hands, is that it permits me to maintain waterstones for sharpening, mix dyes and water-soluble finishes, clean the HVLP spray gun and nozzle, clean restoration projects and use the new polyurethane glues. All of which are necessities. Warning: If there is a sink in the woodshop, don’t use it to dispose of toxic solvents, flammable liquids and other hazardous wastes. Water, soap, dirt and grime are the only things that should go down the drain.

Garage and basement woodshops are often near laundry rooms. This proximity permits the addition of new water pipes to the woodshop area. Copper and PVC pipes are fairly easy to work with and it shouldn’t be too complicated to route pipes several feet to the woodshop. If you aren’t sure about cutting into water pipes, call a plumbing contractor for assistance. Undoubtedly, he can do the work faster than a woodworker!

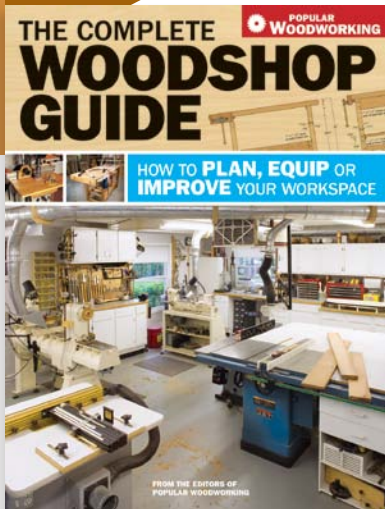
Once the electrical system and plumbing needs have been determined, add these elements to the master plan and draw them onto the planning grid. Hopefully, the proposed design will accommodate all of these elements.

A SUMMARY OF THE WOODSHOP DESIGN PROCESS

1. Create a master plan of all the key woodshop elements: machines, tools, workbench, open areas, lumber racks, storage, electrical and plumbing.
2. Be realistic, as much as possible, and know your own personal interests.
3. Be somewhat hypothetical in choosing the woodshop elements.
At this point you haven’t spent any money.
4. Make paper mock-ups of different woodshop layouts.

5. Be reasonable. Understand that a woodshop takes time and money to create and that you can proceed at your own pace of acquisition.
6. Always consider alternatives. Buy inexpensive, resell and buy more expensive. Consider multipurpose machines. Consider hand tools instead of power tools.

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